D. Remarks

The claims are 1, 2, 5, 7-11, 13, and 16-22, with claim 1 being the sole independent claim. Claims 3, 4, 6, 12, 14 and 15 have been cancelled without prejudice or disclaimer. Claim 1 has been amended to better define the present invention. Support for this amendment may be found, for example, in the cancelled claims, as well as in the specification at page 12, lines 18-25. Claims 2, 5, 7-11, 13, 16 and 17 have been amended to reflect the changes in claim 1 and the cancellation of claims 3, 4, and 6. Claims 18-22 have been amended solely as to form. The specification has been amended to correct various typographical, spelling, and grammatical errors to conform the text better with proper idiomatic English. No new matter has been added. Reconsideration of the present claims is expressly requested.

Claims 1 and 2 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious from U.S. Patent No. 5,994,150 (Challener) in view of U.S. Patent No. 6,642,881 B1 (Lawrence). Claims 3-18 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious from Challener in view of Lawrence and further in view of U.S. Patent Application Publication No. 2002/0021445 A1 (Bozhevolnyi). Claims 19-21 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious from Challener in view of Lawrence and further in view of Bozhevolnyi and U.S. Patent Application Publication No. 2003/0100127 A1 (Corn). The grounds of rejection are respectfully traversed.

Prior to addressing the merits of the rejections, Applicants would like to briefly review some of the features and advantages of the presently claimed invention.

That invention, in pertinent part, is related to a sensor device for detecting a reaction of a sensor material with a specimen based on an intensity of a surface plasmon polariton (SSP) wave generated by light irradiation and propagated along a surface of a sensor medium. This device includes the sensor medium, which comprises a substrate, a metal film having a plurality of openings formed on the substrate, and the sensor material positioned on the metal film for reacting with the specimen.

Importantly, the openings in this device (a) have a size smaller than a wavelength of the irradiation light; (b) have a predetermined pitch that is substantially equal to an integral multiple of a wavelength of the SPP wave; and (c) include adjacent two openings sandwiching a metal film portion having a length of circumstance, which is a substantially integral multiple of a wavelength of the SSP wave.

Due to the size of the openings being as recited in (a) above, the SPP wave is effectively generated. Due to the predetermined pitch being as recited in (b), the SPP waves propagated on the surface of the metal film have the same phase, leading to an increase in their amplitude, which improves sensitivity (page 15, line 14, - page 16, line 1). In addition, due to the two adjacent openings being as recited in (c), the SPP waves, which move around the metal film through the openings, also have the same phase (page 19, lines 6-23). Thus, while the height of resonance peak in the light intensity of the spectrum is further increased, the width thereof decreases, which results in an addition improvement in sensitivity.

Challener discloses a surface plasmon resonance grating sensor using a metal layer, such as shown in Figures 3 and 4:

Fig. 3

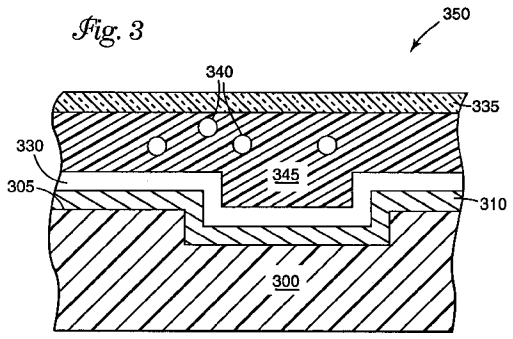
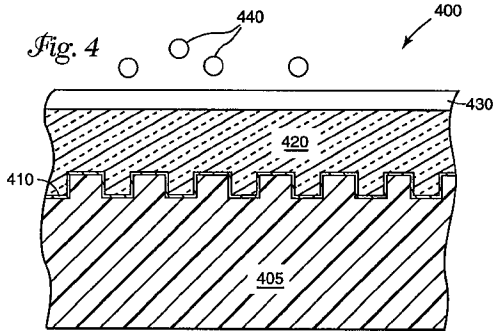


Fig. 4



However, as is evident from the figures and as acknowledged by the Examiner, this metal layer does not have openings. Consequently, Challener also fail to disclose or suggest a pitch of the openings and a particular relationship between the SPP wave and a metal film portion sandwiched between two adjacent openings. In sum, Challener does not teach or suggest any of the above features (a)-(c).

Lawrence discloses a radiation absorber in which a dielectric member is disposed on a metal plate having a corrugated surface. Lawrence describes coupling between the corrugated surface and the SPP wave at column 3, lines 50 - 67. However,

Lawrence does not utilize a metal film with openings. Thus, like Challener, this reference also fails to disclose or suggest both the pitch of openings and the particular relationship between the metal film portion sandwiched between the SPP wave and the metal film portion sandwiched between two adjacent openings.

Bozhevolnyi is directed to SPP band gap structures. While this reference mentions a possible use of an SSP carrying medium that can have deformation in the form of holes, Bozhevolnyi fails to disclose or suggest the parameters as recited in (a)-(c) above.

Corn was cited in connection with a photodetector. This references provides no guidance as to the features (a)-(c), which are absent in the other references.

In the Office Action, the Examiner acknowledged that none of the cited references discloses that the circumference of the metal film sandwiched by two adjacent openings is a substantially integral multiple of a wavelength of the SPP wave. However, the Examiner alleged that since it is known to alter the shape and the pitch of the periodic structure of devices as described in Challener depending on application, one skilled in the art would reasonably be able to alter the periodic structures through routine experimentation and arrive at a configuration with a circumferential length as claimed. Applicants respectfully disagree with this analysis and submit that it is not consistent with the law.

First, in order to apply the Examiner's analysis, the circumference must be recognized as a result-effective variable to be subject to optimization by routine

experimentation. To wit, M.P.E.P. 2144.05(II)(B) states that "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." This does not appear to be so in the present case. The Office Action refers to the changes in the pitch and the shape of the periodic structure. Even, if assumed, *arguendo*, that one would use a structure with the openings in the metal film, changes in the pitch and the shape do not necessarily result in the change of the circumference (e.g., both the pitch and the shape may be changed while the circumference remains constant).

Furthermore, the Board of Patent Appeals and Interferences has indicated that "[o]ptimization of a known result-effective variable in a given range is generally obvious . . . only when it is reasonably expected that an improvement will arise in that range." *Ex parte Atkinson and Benedict*, BPAI Appeal No. 2007-3900 (December 18, 2007) (emphasis added). In other words, the results obtained by "optimization" must have been predictable to one of ordinary skill in the art. This is clearly not the case, since none of the cited references is concerned with circumferential length. Thus, Applicants respectfully submit that, as a matter of law, the circumferential length as claimed is neither disclosed nor suggested.

In conclusion, Applicants respectfully submit that the cited references, whether considered separately or in any combination, fail to disclose or suggest all of the

features of the presently claimed invention. Wherefore, withdrawal of the outstanding rejections and passage of the application to issue are respectfully requested.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

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